Clinical Experience in the Treatment of Pneumonia with Cefuroxime

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The object of this study was to assess the efficacy of, and tolerance to, cefuroxime sodium in treating patients suffering from infection of the respiratory tract. It comprises 35 hospitalized patients.

Patients and Methods

One patient with acute bronchitis, 2 with acute exacerbation of chronic bronchitis and 32 with pneumonia acquired outside the hospital were treated with cefuroxime. Twenty-eight were men and 7 women. The age of the patients ranged from 18–76 years and the average was 53. Sixteen patients were over 60.

The diagnosis of pneumonia was based on rœntgenological findings of pulmonary infiltration and the diagnosis of bronchitis on typical physical findings in a febrile patient. Several patients had concurrent diseases and those occurring most frequently are listed in Table 1. No patient had a history of penicillin hypersensitivity.

Cefuroxime was given in doses of 1.0 g i.m. 3 times daily. The length of the course was 7–12 days and the mean duration of treatment was 9.7 days. One patient had 2 courses. Thirty patients had received no treatment with antibiotics before the administration of cefuroxime was started. Three patients had received a few doses of oral tetracycline and 2 patients oral penicillin. One of these had also had oral erythromycin prior to admission. Cefuroxime was substituted because no response was seen or because of relapse.

Laboratory data were obtained before and after treatment. These included hæmoglobin and white blood count, erythrocyte sedimentation rate, creatinine and blood urea measurements, liver function tests and urine analysis. Blood cultures were obtained before treatment and, if positive, also at the end of treatment. Sputum cultures were obtained before and at the end of treatment. Organisms were identified by standard laboratory techniques and tests of sensitivity were carried out by the disc method of Ericsson & Sherris (1971).

The patients were seen and evaluated daily by the house staff or the investigator. Clinical status, drug tolerance and the results of serial laboratory tests were studied. The response to the treatment was determined by the day of relief of symptoms, drop in temperature and changes in the white blood cell count, sedimentation rate and chest rœntgenograms. The response was judged as *excellent* (that is, complete remission), *improved* or *failure* (no improvement or worsening).

Results

Table 2 lists the organisms isolated in blood cultures. *Pneumococcus* was isolated from cultures in 6 patients. In one of these cases *Staphylococcus aureus* was found in sputum and in another *Hæmophilus parahæmolyticus*.

One blood culture showed a growth of *Peptococcus*, which may have been a contamination. The most frequent organism found in sputum cultures was *Hæmophilus influenzæ* (Table 3). However, the isolation of an organism from the sputum does not provide reliable confirmation of ætiology in pneumonia. Serological tests revealed that one patient had suffered from mycoplasma pneumonia. All the organisms isolated and tested were sensitive to cefuroxime. After treatment, the organism had disappeared.

The clinical response to the therapy was judged as excellent in 30 cases (Table 4). They all showed a rapid and uneventful improvement. In 5 patients, symptoms were still present at the end of treatment but had improved. In 4 of these cases, there was a delayed clearing of the infiltration seen in the chest film. Two of the patients had

Table 1

Concurrent diseases

Diabetes mellitus	3
Cardiovascular disease	13
Chronic alcoholism	7

Table 2

Result of blood cultures

Pneumococcus	6
Pneumococcus and *Enterococcus*	1
Peptococcus	1
Negative	27

Table 3

Sputum isolates

Pneumococcus	1
Staphylococcus aureus	2
β-hæmo, strep Group B	1
Hæmophilus influenzæ	5
Hæmophilus parahæmolyticus	2
Total	11

Table 4

Clinical response

	Cured	*Improved*	*Failure*	*Total*
Acute bronchitis	1	—	—	1
Chronic bronchitis	1	1	—	2
Viral pneumonia	1	—	—	1
Pneumonia	27	4	—	31
Total	30	5	—	35

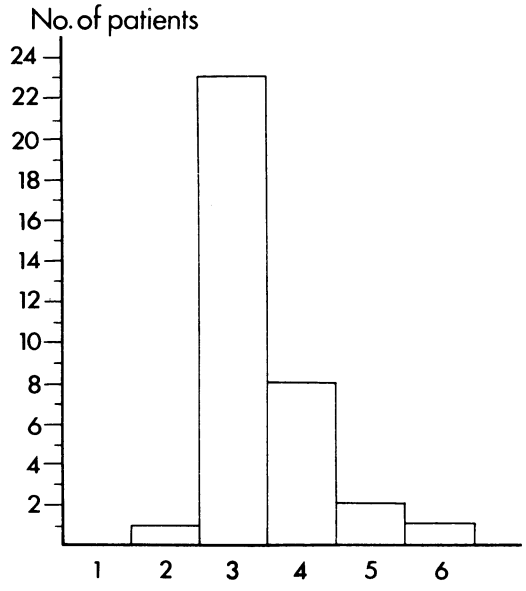

Fig 1 *Day of relief of symptoms*

pneumococcal pneumonia. Both were chronic alcoholics and their general condition was bad. One of these received 2 courses of cefuroxime. The other pair likewise had underlying diseases. The fifth patient had acute exacerbation of chronic bronchitis. All 5 patients finally improved without treatment with other antibiotics. Relief of symptoms could be noted 2–6 days after the start of treatment, mostly on the third day (Fig 1). After treatment the chest film had reverted to normal in 14 patients and in a further 13 cases the radiological changes had greatly diminished. In 5 patients considerable changes were still present but some improvement was noted.

The patients tolerated the drug very well. In 2 cases the liver function tests showed an increased alkaline phosphatase or serum glutamic-oxaloacetic transaminase and in another 2 cases an increase in blood urea was noted. However, it is not possible to determine whether these effects were related to the drug or to the disease.

Side-effects were few. After injections there was no pain or very slight pain lasting for a few minutes. Only 2 patients reported moderate pain with several injections. A skin rash was noted in 1 patient on the ninth day of treatment. The rash disappeared within 4 days after the drug was withdrawn. However, 3 months later the patient again fell ill with pneumonia and on this occasion was treated with cephalexin for 10 days without any adverse effect. It seems unlikely that the rash was associated with cefuroxime. In 2 patients a positive Coombs' test was noted.

Cefuroxime seems to be highly effective in the treatment of pneumonia. The drug is well tolerated and negligible side effects were observed in this study.

Acknowledgment

Our thanks are due to Miss M M C Rees, Glaxo Holdings Ltd, London, for the analysis of the results used in the preparation of this paper.

REFERENCE

Ericsson H M & Sherris J (1971) *Acta pathologica et microbiologica Scandinavica B*, (Suppl.) 217

DISCUSSION

Dr S H Zinner (*Rhode Island*) asked if liver enzyme determinations had been done by colorimetric methods, since certain drugs may interfere with some of these determinations. He also wished to know how long the elevation persisted after therapy had been discontinued.

Dr Gobernado said the SMAC, an automated method, was routinely performed in his laboratory. Elevations were seen only during the treatment and it was difficult to ascribe these to the drug because, with seriously ill patients, they might appear in the normal course of the disease.

Dr de Meutter said that his method had not depended on colorimetry. The values were slightly elevated during treatment but reverted to normal in all patients except one where the underlying disease was known to account for it.

Dr Pettersson said that both his patients had underlying disease, one being an alcoholic the other having heart failure.

Professor C S Goodwin (*Perth*) asked if there was any relation between side effects and dose, since Dr Gobernado's patients had received 30–80 mg/kg.

Dr Gobernado said that the side effects were not related to the dose. The highest dose that they had used was 80 mg/kg body weight, 1 g given every 4 h. In no case had it been necessary to stop treatment.

Dr R D Foord (*Greenford*) said that the transaminase changes were not associated with dosage nor route of administration. They occurred in

0–15% of patients, depending on the study. The levels did not appear unduly high, mostly 20–50 i.u., occasionally up to 100. They virtually always returned to normal within 1–2 weeks after treatment. He did not believe that they were an indication of liver toxicity; they might represent non-specific enzyme induction by the drug. Increased transaminases had been reported with all other cephalosporins and indeed with most antibiotics in the treatment of infectious diseases. They were often to be found in infectious diseases where antibiotics were not used.

Professor Stille (*Chairman*) stressed that patients with pneumonia quite often had slight elevation in transaminases without any antibiotic treatment.

Dr L O Gentry (*Houston*) said that with other cephalosporins that he had worked with, including cefoxitin and cefamandole, the elevation in SGOT was 15%. In a controlled study using penicillin or penicillin-like drugs the incidence was 8% in the penicillin-treated group, as opposed to 15% in those treated with cephalosporins. The effect was non-specific and the issue could not be resolved without control studies.

Dr P E Gower (*London*) asked what effect the drug had on gamma glutamyl transpeptidase, perhaps a better indication of liver damage.

Dr R D Foord (*Greenford*) said he did not know the effect in human subjects, but in the animals they had studied there was no change in gamma glutamyl transpeptidase.

Dr P M Shah (*Frankfurt*) had seen a rise in SGOT only when there was a rise in other transaminases, in patients with underlying disease which accounted for the elevation. In other patients no such rise was seen.

Dr P E Gower (*London*) said that a number of dosing schedules had been offered and while he appreciated that it depended on the sort of infection and type of organism involved, clinicians would require guidance.

Professor Stille (*Chairman*) said that this would be discussed in the final session. The most commonly used regime was 750 mg three times daily, but this decision was not final and higher levels might be recommended subsequently.